Georgia Department of Transportation Office of Planning

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TRAFFIC COUNTING TECHNOLOGY: NOW AND IN THE FUTURE

Two basic components make up a typical traffic counting site. The first component is a sensor array to detect the passage of vehicles. The second component is an electronic counter to convert the sensor signals into traffic data. We use three types of sensor arrays: road tube, in-pavement, and microwave.

SENSORS

The road tube is a mechanical sensor. A vehicle tire striking the tube generates an air pulse that travels through the tube to the counter. Road tubes work best in applications involving short duration counts on narrow roadways with light vehicles traveling at moderate speeds. Multiple tube arrays provide the capability of collecting classification data.

In-pavement sensors consist of wire loop and piezoelectric sensors that send electrical signals to the counter. Loops detect the presence of vehicles in the travel lane, and piezos count axles as the vehicle tires roll over them. In-pavement sensors provide detailed traffic count, classification, and speed data. Certain piezo-loop configurations provide the capability of determining vehicle weights. Installation and maintenance require closing lanes and cutting the pavement, resulting in significant costs. The photograph above shows installation of loop-piezo-loop arrays for classification counts.

Microwave sensors can be installed on the side of the roadway without closing lanes and cutting pavement and are not subject to damage as are sensors installed in or on the roadway. Microwave sensors do not classify by axle and offer only a limited capability to classify by length.

The Georgia DOT installs loop-piezo-loop arrays.

These sensors are primarily used in the metropolitan area where traffic volumes are heavy, roadways are wide, and lane closures are difficult to obtain.

TRAFFIC COUNTERS

The outward appearance of traffic counters has changed little over time, but the latest computer modules and software are quite sophisticated. Portable traffic counters are housed in waterproof cases and have a self-contained power source. Field technicians retrieve the data from these counters with handheld devices. The technicians verify the data, then transmit the files via modem to the Department.

Permanent traffic counters are installed in a roadside cabinet and operate continuously from commercial AC or solar power. Additional modules are installed to handle multiple sensor arrays and for collecting volume, classification and speed data. An automated polling program downloads data nightly to the VAX.

NEW TECHNOLOGY

The Georgia Department of Transportation actively pursues alternative traffic counting systems. One system tested by the Department uses software to analyze video images to count traffic. Other systems use infrared signals to count the axles of vehicles as they pass. The Department will soon test magnetic imaging counters. These counters are bolted to the pavement in the center of each travel lane and use no external sensors. Technicians retrieve the data and replace the batteries at least monthly. The manufacturer advertises the counters as capable of collecting volume and classification by length up to 8 classification lengths or bins.

A recent development is a counter that classifies by axle using a multi-loop sensor array without any piezoelectric sensors.

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STUDY RECOMMENDS UPGRADE OF STATE ROUTE 316

The Department's study of State Route 316 focused on the safety along corridor.

A year-long study addressing many aspects of State Route 316/University Parkway has recently concluded with the release of the study report. The report includes recommendations on short-term and long-term improvements to the entire State Route 316 (SR 316) corridor.

The study's primary purpose was to investigate and identify safety issues on the corridor through Gwinnett, Barrow and Oconee Counties between I-85 and the Athens Loop. Safety on SR 316 was the most pressing concern voiced at the study's Issues Forums, which were a series of public meetings held in each county to solicit public input and comments as the study progressed.

The study made several key findings:

*Traffic on SR 316 is expected to double by the year 2025.

*Population and employment figures within the corridor's three counties are expected to more than double by the year 2025.

*On the freeway portion of SR 316, the rate of fatal accidents and injury-producing accidents was below the average for comparable roads statewide, however on the non-freeway portion the rate of these types of accidents was above the average.

*In the non-freeway portion, accidents with fatalities or injuries have typically occurred at (or near) rural intersections.

*In the freeway portion, non-fatal and non-injury accidents typically occurred at (or near) intersections, especially where motorists experience high levels of traffic and congestion.

Short-term recommendations include:

*Add turn lanes at existing intersections, modify traffic controls and signals, and realign select roadway segments, and excavate at some intersections to improve driver's sight distance.

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MOBILE6 IS HERE

The long awaited update to MOBILE5b is here! Are you asking "What in the world is MOBILE5b?" MOBILE is the Environmental Protection Agency's (EPA) official emission factor model for estimating pollution from highway vehicles. MOBILE calculates emissions of hydrocarbons (HC), oxides of nitrogen (NOx) and carbon monoxide (CO) from passenger cars, motorcycles, light- and heavy-duty trucks. The model accounts for the emission impacts of factors such as changes in vehicle emission standards, changes in vehicle populations and activity, and variation in local conditions such as temperature, humidity and gasoline quality.

MOBILE6 is the first major revision to MOBILE since MOBILE5a was released in 1993. EPA is required by the Clean Air Act to periodically update its motor vehicle emissions model. MOBILE6 is based on actual emissions testing of tens of thousands of vehicles. It was extensively peer reviewed by scientific and technical experts, including the National Academy of Sciences, academics and industry.

New features of MOBILE6 make the model easier to use. The model's input structure is more straightforward, easing data entry. Users can enter more detailed vehicle activity information to better tailor their estimates to local area conditions. Also, the model's new output options makes it easier for users to automate the processing of MOBILE6 results using spreadsheet and database tools.

EPA and the U.S. Department of Transportation have agreed to a two-year grace period for incorporating MOBILE6 in conformity analyses. The grace period is intended to allow time for States to revise their State Implementation Plans (SIPs) to be reflective of MOBILE6 parameters. When the grace period ends on January 29, 2004, MOBILE6 will become the approved model for new transportation conformity analyses.

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ANOTHER YEAR, ANOTHER STATE MAP:
GEORGIA STATE TRANSPORTATION MAP

Back in 1995, the Department started using GIS (Geographic Information System) to create, edit and update the state's maps. What is GIS? Simply put, GIS is combined layers of spatial and tabular information stored in distributed databases. Is a map created with GIS better than a map done the traditional manual way? Making maps with GIS is much more flexible. Since the GIS map uses GIS-based cartographic databases, map products can be created around any location, at any scale and conveying selected information effectively by symbolizing specific characteristics. A map can be created anytime for anyone, as long as the data is available. Not just any data but good quality spatial data.

Maps created from the GIS databases can automatically reflect any changes in the GIS databases, allowing changes to a map to be made with minimal effort and cost. GIS gives us the layout and drawing tools that help us make great presentations with clear, compelling documents. GIS is also being employed as a multimedia technology-delivering digital audio and video information linked to maps, charts and tables.

Some of the different layers of data that make up the State Map as well as the county and city maps are roads (State Routes, County Roads, City Streets), boundaries (County and City Boundaries), wetlands (Lakes, Rivers, swamps), cultural features (Historic sites, Names), and Transportation (Airports, Railroads). GIS pulls information together from these different databases to create the maps.

As you can see, a lot more goes into creating the map since we started using GIS. The State map has become something more than just colorful lines and pretty pictures.

So, the next time you use the State Map to plot you next trip around the State of Georgia, consider the layers of information that may have been used to produce it.

To obtain the current 2002-2003 State Transportation Map, contact:

Map Sales
Georgia Department of Transportation
No. 2 Capitol Square
Atlanta, GA 30334
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The 2002-2003 State Highway Map is available through the Georgia DOT map sales office.

State Route 316 Study.......Continued

Long-term recommendations include:

*Upgrade the non-freeway section to a freeway with interchanges and overpasses at key crossroads, which would significantly decrease the rate of fatal and injury-producing accidents.

*Based on the data collected by the study regarding travel patterns on SR 316, there is the need for adding a High Occupancy Vehicles (HOV) lane, commonly known as a carpool lane, through the entire corridor.

*Design the proposed HOV lanes as "barrier separated" so that vehicles in the HOV lane are physically separated from the general lanes by a concrete barrier. (Access to and from the HOV lanes would be via multiple, special interchanges along the corridor that directly connect to the local street system).

*Implement a roadway toll system that, in combination with traditional funding from federal and state sources, would greatly accelerate the timeframe for upgrading SR 316 to a freeway with HOV lanes. (If only traditional funding methods were pursued, the completed upgrade could take as long as 25-30 years).

The study focused on safety but also addressed issues including traffic congestion, economic development, demographics, and current and future land use. A full public involvement process, as an integral part of the study's progress, was highlighted by a project website, community outreach, and a series of well-attended public forums throughout the corridor. The Public Involvement Process was designed to gather citizen insight on the alternatives as they were being developed. The final report is available on the Office of Planning's web site at: **http://www.dot.state.ga.us/dot/plan-prog/planning/studies/sr316corridor/index.shtml**

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TRAFFIC COUNTING.............CONTINUED

These hand held devices allow the Georgia DOT to gather data in the field. Technicians are then able to transmit the files via modem to the Department.

This type of array could be useful on interstate highways, as loops are easier to install and last longer than piezos. If so, long-term operational and maintenance costs could be reduced significantly.

Research into this and other emerging technologies will continue to enhance our ability to collect comprehensive and inexpensive traffic data.

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